Claims

[c1] 1. A scintillation detector comprising a substantially cylindrical crystal element mounted in a substantially cylindrical housing, one end of said housing adapted for coupling with a photo-multiplier tube, said substantially cylindrical crystal element wrapped about a circumferential surface thereof with a gadolinium foil.

[c2] 2. The scintillation detector of claim 1 wherein said crystal element is formed with a conical forward portion, and wherein said conical portion is also wrapped with gadolinium foil.

[c3] 3. The scintillation detector of claim 1 wherein a gadolinium dish covers a rear face of said crystal element.

[c4] 4. The scintillation detector of claim 1 wherein said crystal element is comprised of sodium iodide.

[c5] 5. The scintillation detector of claim 1 including a photo-multiplier tube affixed to a forward end of said crystal element.

[c6] 6. A scintillation detector comprising a sodium iodide crystal element mounted within a housing coupled at one end to a photo-multiplier tube, said crystal element substantially enclosed by a gadolinium foil within a stainless steel sleeve.

[c7] 7. The scintillation detector of claim 6 wherein said crystal is wrapped with a reflective tape, and said gadolinium foil is radially between said reflective tape and said stainless steel sleeve.

[c8] 8. The scintillation detector of claim 7 wherein said crystal element is formed with a conical forward portion, and wherein said conical portion is also wrapped with gadolinium foil.

[c9] 9. A scintillation detector comprising a substantially cylindrical crystal element mounted in a substantially cylindrical housing; a radial and axial support assembly within said housing, located radially between said crystal element and said housing, said radial and axial support assembly including a gadolinium foil

sleeve substantially surrounding said crystal element.

[c10] 10. The scintillation detector of claim 9 including a photo-multiplier tube affixed to a forward end of said crystal element.

[c11] 11. The scintillation detector of claim 10 wherein said radial and axial support assembly includes a circular disc of gadolinium covering a rearward face of said crystal element.

[c12] 12. The scintillation detector of claim 9 wherein said crystal element is formed with a conical forward portion, and wherein said conical portion is also wrapped with gadolinium foil.

[c13] 13. The scintillation detector of claim 9 wherein said radial and axial support assembly includes a radially outer sleeve and a radially inner sleeve, and wherein said gadolinium foil sleeve is located radially between said radially outer and radially inner sleeves.

[c14] 14. The scintillation detector of claim 13 wherein said radially outer sleeve is comprised of stainless steel.

[c15] 15. The scintillation detector of claim 14 wherein said radially inner sleeve is comprised of a polyamide.

[c16] 16. The scintillation detector of claim 14 wherein an aluminum collar is fixed to an underside of said radially outer sleeve at one end thereof, and wherein said gadolinium foil sleeve extends across said collar.

[c17] 17. The scintillation detector of claim 16 wherein said gadolinium foil sleeve is adhesively secured on a radially inner surface thereof to said radially inner sleeve only in an area that is aligned with said aluminum collar.

[c18] 18. The scintillation detector of claim 17 wherein most of a remaining area of said radially inner surface is covered with grease.

[c19] 19. The scintillation detector of claim 16 wherein a radially outer surface of said gadolinium foil is adhesively secured to said underside of said radially outer sleeve.